BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF COMMERCE

DEPARTMENT OF BANKING AND FINANCE

FINANCIAL MATHEMATICS (BS114)

DURATION: 3 HOURS MAR 2024

INSTRUCTIONS TO CANDIDATES

1. Answer any **four** questions.
2. Answer each question on a fresh page.
3. No cell phones are allowed in the examination room.
4. You may use non programmable calculators.

QUESTION ONE

Projects A and B both require $20 000 initial investments and have projected cashflows as follows shown in Table 1 below:

Table 1

Year	Project A	Project B
1	10 000	7 000
2	8 000	7 000
3	6 000	7 000
4	4 000	7 000

Required:

a) Calculate each project's net present value if the required rate of return is 12%. (10)

b) Calculate the internal rate of return for each project. (10)

c) Determine the project to be chosen and give reasons for your choice. (5)

[25 marks]

QUESTION TWO

a) Define a derivatives market. (3)

b) Identify and explain three participants in the derivatives market. (9)

c) State and explain any three reasons for the establishment of the derivatives market. (9)

d) Differentiate forward contracts from the futures contracts. (4)

[25 Marks]

QUESTION THREE

a) Explain the following theories of the term structure of interest rates:

i) The expectations hypothesis (8)

ii) Liquidity preference theory (8)

iii) Market segmentation theory (9)

[25 Marks]

QUESTION FOUR

a) Identify and explain any two characteristics of bonds. (5)

b) You are given the following information in Table 2 below:

Table 2

	BOND A	BOND B
Maturity	10 years	15 years
Coupon rate	8 %	4 %
Par value	$1 000	$1 000

Required:

c) If both bonds had a required rate of return of 8%, determine the price of bond A and the price of bond B (10)

d) Describe what it means if a bond sells at a discount, a premium and at its face value. (6)

e) State whether these bonds are selling at discount, premium or at par, giving reasons in each case. (4)

[25MARKS]

QUESTION FIVE

a) Differentiate the following

i) ordinary annuity and an annuity due. (3)

ii) Present value and future value (3)

b) A company intends to borrow RTGS$150 000 to finance the purchase of new machinery. The Finance manager is considering taking a 12% loan from First Capital Bank that will be amortized over the next 5 years in equal instalments.

Required:

i) Determine the amount of money the company is expected to pay annually. (5)

ii) Calculate the interest payment per year (10)

iii) Calculate the total amount that will be used to discharge the loan (4)

[25 marks]

QUESTION SIX

a) Using appropriate examples distinguish between:

i) simple interest and compound interest (6)

ii) Financial System and Financial Markets (6)

iii) Money market and capital market (6)

b) Determine the price of a Treasury bill with a face value of $1000, 28 days to maturity and a discount rate of 2.61%. (3)

b) Calculate the bond equivalent yield of a Treasury bill with a return of 2.03%, 28 days remaining to maturity. Assume 365 days for the year.

(4)

[25 Marks]

END OF EXAMINATION